

Applicant: Juha Maijala et al.
Application No.: 10/507,436
Response to Office action dated Apr. 10, 2008
Response filed July 8, 2008

Claim Listing

1–19. (cancelled)

20. (currently amended) A method for coating a surface of a continuous paper or board web formed of papermaking fibers, with a homogeneous dry coating powder, the method comprising the steps of:

moving the continuous paper or board web between electrodes which are at different electrical potentials;

applying the homogeneous dry coating powder on to a first surface of the continuous paper or board web by utilizing the difference in the electric potential, wherein the homogeneous dry coating powder is formed from 70–99% inorganic material consisting essentially of having an average particles having a size of [0.1 –] greater than 1 µm to 500 µm, and wherein the homogeneous dry coating powder is comprised of 1–30% polymeric binder material; and finishing the homogeneous dry coating powder on the surface of the paper or board web so that a more homogenous coated surface is achieved.

21. (previously presented) The method of claim 20, wherein the homogeneous dry coating powder is formed from 80–95% inorganic material.

22. (previously presented) The method of claim 20, wherein the homogeneous dry coating powder is formed by freeze-drying.

23. (previously presented) The method of claim 20 wherein the homogeneous dry coating powder has an average particle size of 1–15 micrometers.

24. (previously presented) The method of claim 20 wherein the continuous paper or board web is caused to travel at a speed of 1,200 to 2,500 m/min.

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25. (previously presented) The method of claim 20 wherein the polymeric binder material has a glass transition temperature of 20° C to about 100° C.

26. (previously presented) The method of claim 20 wherein the homogeneous dry coating powder has a moisture content of less than 15%.

27. (previously presented) The method of claim 20 further comprising the step of pre-charging the homogeneous dry coating powder.

28. (previously presented) The method of claim 20 wherein the step of finishing further comprises simultaneously adhering and smoothing the homogeneous dry coating powder to form a first coated surface of the web, by passing the web through a nip formed by a hot hard roll and a moving earthing member and subjecting the homogeneous dry coating powder on the web to a temperature of 80–350°C, a linear nip load of 25–450 kN/m and a nip dwell time of 0.1–100 ms.

29. (previously presented) The method of claim 28, further comprising the step of, after finishing the dry coating by simultaneously adhering and smoothing the homogeneous dry coating powder to form the first coated surface of the web, treating the first coated surface at least in a nip formed between a heated roll and a resilient roll.

30. (previously presented) The method of claim 28 further comprising the step of, after finishing the dry coating by simultaneously adhering and smoothing the homogeneous dry coating powder to form the first coated surface of the web, treating the first coated surface in a substantially long nip formed between two counter surfaces.

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31. (currently amended) A method for coating a surface of a continuous paper or board web formed of papermaking fibers with a homogeneous dry coating powder, the method comprising the steps of:

forming the homogeneous dry coating powder from 70–99% inorganic material

consisting essentially of having an average particles having a size of [0.1 –] greater than 1 μm to 500 μm and a polymeric binder material forming 1–30% of the homogeneous dry coating powder;

preparing a first surface of the paper or board web to receive the homogeneous dry coating powder by a process which changes the surface properties of the paper or board web;

transporting the homogeneous dry coating powder as a more than 1% by volume mixture with air;

allowing the web to move between electrodes, which are at different potentials;

spraying the homogeneous dry coating powder through an electric field and a free-ion concentration to the surface of the paper or board web which has been prepared to receive the homogeneous dry coating powder, said spraying taking place along the direction of the electric field, while the paper or board web is backed by a moving earthing device; and

finishing the homogeneous dry coating powder by simultaneously adhering and smoothing the homogeneous dry coating powder to form a first homogeneous coated surface of the web, by passing the web through a nip formed by a hot hard roll and the moving earthing member, and subjecting the homogeneous dry coating powder on the web to a temperature of 80–350°C, a linear nip load of 25–450 kN/m and a nip dwell time of 0.1–100 ms.

32. (previously presented) The method of claim 31, wherein the homogeneous dry coating powder is formed from 80–95% inorganic material.

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33. (previously presented) The method of claim 31 wherein the homogeneous dry coating powder has an average particle size of 1–15 micrometers.

34. (previously presented) The method of claim 31, wherein the homogeneous dry coating powder is formed by freeze-drying.

35. (previously presented) The method of claim 31, wherein the continuous paper or board web is caused to travel at a speed of 1,200 to 2,500 m/min.

36. (previously presented) The method of claim 31, wherein, the organic material has a glass transition temperature of 20° C to about 100° C.

37. (previously presented) The method of claim 31, wherein the homogeneous dry coating powder has a moisture content of less than 15%.

38. (previously presented) The method of claim 31, further comprising the step of pre-charging the homogeneous dry coating powder.

39. (previously presented) The method of claim 31, further comprising the step of, after finishing the dry coating by simultaneously adhering and smoothing the first coated surface of the web, treating the first coated surface at least in a nip formed between a heated roll and a resilient roll.

40. (previously presented) The method of claim 31 further comprising the step of, after finishing the dry coating by simultaneously adhering and smoothing the homogeneous dry coating powder to form a first coated surface of the web, treating the first coated surface in a substantially long nip formed between two counter surfaces.

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41. (previously presented) The method of claim 31 wherein the first side and a second side of the web are coated simultaneously.

42. (previously presented) The method of claim 31 wherein the first side and a second side of the web are coated sequentially.

43. (previously presented) The method of claim 31 wherein at least one additional layer is formed on the first coated surface by a dry surface treatment process.

44– 47. (canceled)